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SCIENCE NEWS LETTER

Vol. 53, No. 14

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 3, 1948

"Big Eye" of Palomar

See Page 218

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ENGINEERING

New Magnetic Oil Clutch

Of number one importance, this oil contains millions of iron dust particles or other magnetic material, which may also be used in automobile brakes.

➤ MAGNETIC oil is the key to a new automobile fluid clutch just revealed by the National Bureau of Standards. Its development is a discovery of number one importance. The oil contains millions of tiny particles of iron dust or other magnetic material. The car electric system magnetizes them as needed.

This new magnetic fluid clutch is very simple. It has three elements only, a driving shaft with a plate at its end, a driven shaft and plate, and the iron-saturated oil between. When a magnetic field is established between the two parallel plates, the magnetic particles form chains which bind the two plates together as tightly as if they were held by strong spring clamps.

Operation of the clutch is described as extremely smooth and without "chatter." The locking force is practically constant, and the bond between the two plates is a function of the gradual increase of the magnetic field, which is electrically controlled. The relation between the amount of magnetization and the bond between the plates is independent of speed. There is no point at which the clutch suddenly tightens to produce a jerk. Slippage is practically completely eliminated.

This magnetic oil may be used in brakes as well as in clutches, but according to its inventor, Jacob Rabinow of the Bureau staff, it has other applications which may be even more important. These are in servo-mechanisms, instruments to translate electronic "information" into appropriate action in purely mechanical equipment. Such devices are used for power steering of large trucks, tanks, steamships and airplanes. They are also used in printing presses, power machinery, for the control of radar antennas, gun direction control, and in high-speed electronic computers.

Since the amounts of electric power required to control the magnetic fluid clutch are small, it is a simple matter to interlock the electrical circuits with the speed, throttle setting and power demands. It has been found by experiment that the nature of the oil used has relatively little bearing on performance. Hence silicone liquids may be employed with excellent results, enabling the clutch to operate at very low and very high temperatures.

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MAGNETIC FLUID—It consists of a mixture of fine iron powder and oil which forms the heart of the NBS magnetic fluid clutch. When acted upon by a small permanent magnet, that portion of the mixture in the magnetic field "solidifies", as the iron particles become mutually attracted, and adheres to the magnet.

MEDICINE

Triple-Play Attack on TB

Promin, streptomycin, promizole and para-aminosalicylic acid are being used to fight the disease. Doctors hope to triple results.

➤ A NEW triple-play attack on tuberculosis is being made by scientists at the Mayo Clinic and Foundation, in Rochester, Minn. Promin, a drug once tried and abandoned, is being used together with two other anti-TB chemicals.

Streptomycin, most hopeful of the drugs combatting TB, is one of the trio, while both promizole and PAS (para-aminosalicylic acid) are used as the third chemical.

Results three times as good as with any one drug alone are hoped for.

News of this three-pronged attack on the white plague will reach medical scientists through a report by Drs. William H. Feldman, Alfred G. Karlson and H. Corwin Hinshaw in the *Proceedings of the Staff Meetings of the Mayo Clinic* (March 3).

Promin had been tried as a TB remedy as early as 1940. But then it was being given to the patients in pills or capsules, and it had a damaging effect on red blood cells. So not enough could be given to get any good results.

Now it is known that much larger doses can be given safely if the drug is injected into the patient's veins. This was discovered by Dr. G. H. Faget, of the U. S. Public Health Service, when he tried it as a remedy for leprosy. Promin has proved so successful in leprosy that now the number of patients who get well and can be discharged from the National Leprosarium at Carville, La., is greater each year than the number of new patients coming to the institution.

These results with promin given by vein encouraged the Mayo Clinic group to try it again in tuberculosis. Studies with guinea pigs showed it was just as effective whether given by mouth, by vein or by injection under the skin.

By combining promin with streptomycin and either promizole or PAS, each of which has some effect against TB germs, the Mayo group hopes to get the sum of the benefit of each. In other words, the new treatment should be three times as effective as treatment with either drug alone.

Fortunately, the damaging effects do not add up that way. Promin can damage red blood cells, streptomycin can damage nerve cells, and promizole and PAS may have bad effects on stomach and intestinal tract. When all three drugs are given, it is possible to give small enough ones of each to avoid the dam-

aging effects without reducing the anti-TB action.

It will be "most difficult," the scientists point out, to determine the benefits of the mixture to the patients. But they are also interested in the results on the tuberculosis germs. The combination treatment might delay the development of resistance by germs to streptomycin.

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CHEMISTRY

Improve Synthetic Rubber

This new low-temperature product, after exhaustive tire tests, has proved to be superior to other synthetically produced rubber and better than natural rubber.

➤ SYNTHETIC rubber, produced at much lower temperatures than used in most Buna S production, is better than the natural product, University of Minnesota chemists claim. The low-temperature process was developed in the university laboratories, at Minneapolis, and may result in sweeping changes in the American rubber industry's production methods.

The Minnesota process has been tested and modified in several industrial laboratories and has been tried out on a pilot plant stage, Dr. I. M. Kolthoff of the university staff stated. Exhaustive tire tests have proved that the new product is superior to any synthetic rubber previously produced and considerably better than natural rubber, he said.

Under usual methods of production of Buna S, the rubber formation in the mixture used takes place at a temperature of 122 degrees Fahrenheit, and the process requires from 12 to 14 hours. In the new process it is possible to make rubber within a reasonably short time at temperatures in the vicinity of the freezing point of water. In this process an organic peroxide is used as a catlyst instead of the inorganic salts usually employed.

Key to the superiority of the new rubber lies in the fact that its molecules are more uniform than those in other rubbers, he explained. This uniformity results from effecting the polymerization process at the lower temperatures.

In making Buna S (GRS) rubber, the standard ingredients are 70 parts butadiene, derived from either petroleum or alcohol, and 30 parts styrene, chiefly a coal derivative. When the mixture is put into a container, the top layer is made up of these two ingredients, while below is a layer of water containing a dissolved emulsifier such as soap and usually a dissolved catalyst, an activating chemical agent.

When the mixture is stirred or rotated, polymerization takes place, and the resulting rubber particles remain suspended in the aqueous, or water, layer. With the addition of acid, such as sulfuric acid, the rubber particles coagulate into a pliable mass easily separated.

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ENGINEERING

Navy Checks Silt Deposits

➤ A SURVEY of the silt that threatens to fill the bottom of the Grand Canyon of the Colorado under the surface of the great reservoir behind Hoover Dam is now underway. Navy men and a miniature Navy fleet are assisting the Department of the Interior in this job.

The Navy fleet consists of a self-propelled 107 by 21 foot barge and smaller boats, all brought overland from the ocean. The men are divers but are also technical experts in the use of depth-sounding equipment, underwater photography and surveying. The investigations will show the amount of silt already deposited in the 12 years since water was impounded. Anti-silting measures will follow.

The silting of this artificial lake, which when constructed had a capacity of 32,000,000 acre-feet of water, was foreseen when the dam was built. It was known that the turbulent Colorado would deposit its load of fine earth and sand when it reached the quiet waters in the reservoir. Reliable estimates of the rapidity with which the lake's bottom would rise could be made then. The data to be obtained now will assist engineers in designing the best silt-control methods suitable for use in this particular application, and much information for applying elsewhere.

The Hoover Dam is a combination flood-control, irrigation, hydroelectric power, and domestic water construction. Before its construction the "untamable" Colorado, as it was called, destroyed annually farmlands, homes, bridges and highways from near the Nevada boundary to the Gulf of California. Electric plants at the dam have a capacity of over 1,000,000 kilowatts. No water for irrigation and domestic uses is taken from Lake Mead, the Hoover Dam reservoir, but it is taken at lower points. These lower dams on the river, now safe from destruction by the flood-controlling Hoover Dam, supply water for giant irrigation projects in Arizona and California, and domestic water for the Los Angeles area.

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ENGINEERING

Pint-Sized "Memory" Unit

By reducing the physical size of this mercury unit developed for high-speed electronic computers, it has been made practical for use in commercial equipment.

A THOUSAND numbers can be stored in a pint of mercury, "memory" unit developed for high-speed electronic computers, Isaac L. Auerbach told members of the Institute of Radio Engineers, meeting in New York.

Five million pulse signals per second can be sent into the mercury memory perfected by Mr. Auerbach, J. Presper Eckert, Jr., C. Bradford Sheppard and Robert F. Shaw of the Eckert-Mauchly Corporation of Philadelphia.

The device, details of which are revealed for the first time, is based on a radar development. It is said to be ten times as fast as former methods. Recent developments have made it possible to reduce the physical size of the delay memory unit so that now it is practical for use in commercial equipment.

Large business and mail order companies, as well as banks and statistical groups, are expected to benefit by this new development. A computing system using the new mercury memory can operate so fast and thus handle such a tremendous volume of data that it promises great economies in routine work.

Sound waves traveling through a column of mercury are the means used for storing numerical data and operating instructions. Quartz crystals resonant at frequencies between ten and fifteen million cycles per second are used.

Two little crystals are placed at opposite ends of the mercury column. One acts as a loud speaker, transmitting supersonic code pulses like Morse Code when pulsed with electrical signals. These pulses, representing the numbers to be remembered, travel down the column of mercury to another crystal. This acts as a microphone and changes the pulses back to electrical signals.

The sonic code pulses, Mr. Auerbach explained, travel only one-millionth as fast in the mercury column as do electrical signals on a wire. The first pulse transmitted is not received by the second crystal until thousands of pulses have entered the column from the transmitter.

The code pulses are effectively "remembered" during the interval that they are traveling down the column. If the numbers must be remembered for a longer period than it takes them to pass through the mercury column, the code signals are returned electrically to the transmitting crystal and again pass through the mercury column. By repeating this process, data can be stored as long as desired.

The electrical signals in the model are compressed into a column of mercury only one-fourth as long as in early designs. To do this, all parts of the circuit were made to operate four times as fast as before. A second achievement of the new model is that most of the accurate machine work, which has made other designs costly, is eliminated.

A mercury "memory" slightly larger than the one reported here is used in the UNIVAC (Universal Automatic Computer) described at the meeting by Dr. John W. Mauchly, president of the company. This can hold as many as 1,000 twelve-digit numbers. Data and instructions placed in this built-in memory are immediately accessible to the machine for use in its computations.

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***MERCURY MEMORY UNIT—** The mercury tube shown here being held by Isaac L. Auerbach, one of the men who perfected it, is the core of the new memory system in which a thousand numbers can be stored. Just revealed, it is said to be ten times as fast as former methods.*

RADIO

Television at a Distance

THE popular belief that television reception is restricted to line of sight, that a person at the receiving antenna should be able to see the transmitting antenna on a clear day, is not true, the Institute of Radio Engineers, meeting in New York, was told by T. T. Goldsmith, Jr., and R. P. Wakeman of Allen B. DuMont Laboratories, Passaic, N. J.

Actually the signal strength simply decreases quite rapidly beyond the horizon of the transmitting antenna, they declared. That there is sufficient signal to produce satisfactory television pictures far beyond the horizon, even 125 miles from the transmitter, is shown by a survey they recently made.

The survey covered a six-months period in which 1,500 measurements were made and 500 photographs taken within a 50-mile radius of New York City. In addition to the ground survey, measurements were taken from an airplane which flew 2,000 miles within a radius of 200 miles of the city.

Great variations in signal strength beyond the horizon were observed with changes in the atmosphere, they said. These may occur very rapidly, or the variation may be a very slow change throughout the day or season.

The survey indicates the desirability of locating a transmitting antenna well above any structures in the vicinity. This eliminates the possibility of ghosts which originate in the vicinity of the transmitter and which can not be removed by anything done at the receiver or receiving antenna. Higher power at the transmitter will increase the signal-to-noise ratio at receivers. These two changes at the transmitter would permit a cleaner, more stable picture, they concluded. At the receiver location, the antenna should be installed as high up and as far away from noise sources as practicable.

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TESTING GUNS IN EXTREME COLD—Braving 70-below-zero cold to test guns and ammunition, these Navy ordnancemen are loading a 50-caliber machine gun. Almost all gear is electrically operated by remote control. The suits worn by the men contain electric heating units and the guns are fired through quick opening ports.

ORDNANCE

Cold Armor Plate Tested

➤ TESTING armor plate, cooled to extreme low temperatures, for the effects of gunfire is one of the projects conducted at the Naval Proving Grounds, in Dahlgren, Va.

Five-inch thick armor steel plate is subjected to minus 70 degrees Fahrenheit in one of the Navy's cold chambers for 24 hours. Then it is packed in dry ice and rushed to a nearby range where it is peppered with shells to test its resistance at extreme cold.

Not all temperature testing at this station is at the lower end of the thermometer scale. High heat is also used, including tropical temperatures up to 140 degrees. The range from plus 140 to minus 70 degrees is thought to be unequalled by nature at any one location.

The equipment includes two cold chambers large enough to accommodate a five-inch gun, and a high-altitude chamber which permits simulation of conditions at 50,000 feet above sea level. In all, the controlled temperature facilities include the altitude chamber, an instrument test chamber, a gun test room, and a tank test room. This latter is used particularly by the Army. It is 37 feet long, 15 feet wide and 16 feet high. Its temperature range is from 125 degrees above to 67 below zero Fahrenheit. Although no firing can be done in this room, it makes possible a number of studies in the climatic adaptability of equipment.

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AERONAUTICS

Seaplane Tests Radar

➤ THE departure from New York to Germany of an all-cargo plane with a radar nose and improved radar equipment marks the beginning of a year of testing to determine the most practical uses of this navigation aid in over-ocean flying. Many transports on overland routes are now using radar.

This test project is with a Douglas DC-4 plane of the Pan American World Airways, and is being conducted jointly with American Airlines. Findings will be available to the U. S. Navy which requested the undertaking. The regular nose of the plane has been replaced with a plastic dome to contain the radar antenna.

The installation will enable a pilot to "see" on his radarscope the ocean surface below or the area ahead for some 40 miles in spite of heavy overcast weather. It will enable him to detect cloud formations that spell bad weather or turbulence so that he can make a detour. This contributes to safety and smooth flying.

Installations of radar altimeters have recently been completed in 109 planes of the United Air Lines as well as in many planes of other companies. These instruments, sometimes called terrain clearance indicators, transmit radio signals to the ground and receive back reflected signals that give a continuous reading of the contour below and also a warning signal if the plane approaches too close to the earth for safety.

All planes of the Trans-World-Airline (TWA) are now equipped with the relatively new Howard Hughes radar anti-collision device. This can be set to give automatic warning of mountains ahead or earth below at either 2,000 or 500 feet away. It is a radar transmitter-receiver set, weighing 15 pounds, which obtains power from the plane's battery at 28 volts.

The development of light-weight radar makes these installations in commercial planes possible. The wartime types used by the armed services were too heavy for commercial planes, took up too much room and required too many operators.

At the close of the war, the Air Force Materiel Command, in collaboration with other agencies including radar manufacturers, set about making light-weight radar. A set weighing 125 pounds, one-fourth the standard Army type weight, was completed. General Electric, one of the collaborators, later announced an apparatus weighing from 100 to 150 pounds, with a gyroscopically stabilized antenna, which was eight times more powerful than the previous Air Force model.

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Rubber in chlorinated form is used in special types of protective coatings made by paint manufacturers for use where a high degree of resistance to acids and alkalis is essential.

MEDICINE

Mass Vaccination for TB

Eleven European countries are about to enter into this program involving some 15,000,000 children. BCG, made from weakened TB germs, will be used.

➤ THE largest mass vaccination of children ever undertaken is about to get under way in 11 European countries. The vaccinating will be done in an attempt to stop the tuberculosis epidemic which has followed the war.

BCG, made from living but greatly weakened TB germs, will be used. The germs have lost their power to cause disease but are able to mobilize the body's TB-resisting forces and thus give immunity to the disease.

Some 15,000,000 children will be vaccinated, according to present plans. Before the actual vaccinating starts, 50,000,000 children will be tested for susceptibility to tuberculosis.

The testing and vaccinating will be under the direction of Dr. Johannes Holm, technical director of the Danish Red Cross. This organization and its Scandinavian associates, the governments of each of the 11 countries, and the World Health Organization are cooperating in the mass procedure for checking TB. The American Overseas Aid—United Nations Appeal for Children has voted $2,000,000 from its funds to help finance the project, and has earmarked another $2,000,000 for the same sort of TB fight now being planned for Far Eastern and South American countries.

The 11 European countries where the program will be launched immediately are: Finland, Albania, Hungary, Bulgaria, Czechoslovakia, Yugoslavia, Greece, Italy, Rumania, Austria and Poland.

Tuberculosis cases are now four to five times the normal rate in Europe, Dr. Holm reports. More food and BCG vaccination at once are the only measures for checking the disease, in his opinion. A pilot test he conducted in Hungary showed that two-thirds of the children there already have or have had tuberculosis. On these figures he bases his estimate that 15,000,000 children throughout Europe, one-third of its child population, need BCG vaccination to help them escape the disease.

The BCG for the mass vaccinations will be produced by the Danish Serotherapeutic Institute in Copenhagen and the Pasteur Institute, Paris.

Several large scale trials of BCG vaccination are now under way in the United States under the auspices of the U. S. Public Health Service and state and municipal health departments. But general vaccination of the population in this country is not recommended by such TB authorities as the American Trudeau Society and the medical section of the National Tuberculosis Association.

When the vaccine is prepared under ideal conditions and given to tuberculin-negative persons by approved techniques, it "can be considered harmless," these organizations state. But they add that "the degree of protection reported following vaccination is by no means complete nor is the duration of relative immunity permanent or predictable."

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ASTRONOMY

Comet Bester Now Visible

➤ COMET BESTER, now visible through binoculars, is only one of 15 comets now known to be in the heavens.

It is the only one, however, that is bright enough to be easily found. The recently discovered Comet Pajdusakova-Mrkos can be picked up with a small telescope. A larger instrument is needed to find the others, one or two of which are as faint as nineteenth magnitude.

"If a tail like that on Comet 1947n, the spectacular southern-hemisphere comet, had formed on Comet Bester," stated Dr. Leland E. Cunningham of Students' Observatory, University of California, at Berkeley, "it would have been a conspicuous object in field glasses or binoculars. With a stringlike tail that is but faintly visible at best, it appears mostly as a blob of light that moves slowly across the sky."

The long, narrow tail of the comet comes out of the comet's nucleus instead of being formed from the entire head, as was the case with Comet 1947n (*See SNL*, Jan. 31).

The comet is following quite exactly the path predicted for it by Dr. Cunningham last fall. It is less bright than astronomers had hoped, but then comets are notorious in being slightly fainter or brighter than predicted. It is also impossible to estimate accurately just what they will look like, or even whether they will have tails at all.

Those who wish to see Comet Bester will have to be real night-owls. It is visible just before dawn. On April 3 it will be about one-third of the way from the first magnitude star Vega to the first magnitude star Deneb Cygni. On April 7 the comet's right ascension will be 18 hours, 50.5 minutes, its declination plus 50 degrees, 26 minutes. On April 13 it will be directly north of the head of "Draco," the dragon.

So far this year, four comets have been reported, three of them later being picked up by other observatories. One of these, discovered by C. A. Wirtanen of the University's Lick Observatory, is unique in that it is the faintest periodic comet on record, Dr. Cunningham stated. It is now of the nineteenth magnitude.

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COMET BESTER—Now visible, its long, narrow tail comes from the comet's nucleus instead of being formed from the entire head, as was the case with Comet 1947n.

GENERAL SCIENCE

Science Foundation Bills Again Before Congress

➤ THE establishment of a federal national science foundation this year is predicted now that identical bills understood to be acceptable to both Republican leaders and the President have been introduced into both houses.

The new bills remedy one of the reasons for presidential veto last session by providing for presidential appointment and Senate confirmation of the director of the foundation.

Sen. H. Alexander Smith, R., N. J., led a group of senators in introducing the bill into the Senate, while Rep. Charles A. Wolverton, R., N. J., introduced the bill in the House. The following senators joined with Sen. Smith in introducing the new bill S. 2385: Sen. Guy Cordon, R., Ore.; Sen. Chapman Revercomb, R., W. Va.; Sen. Leverett Saltonstall, R., Mass.; Sen. Elbert D. Thomas, D., Utah; Sen. Harley M. Kilgore, D., W. Va.; Sen. Warren G. Magnuson, D., Wash.; Sen. J. William Fulbright, D., Ark.

The legislative path of the new proposal has been smoothed by meetings of congressmen and at least tacit approval of the Bureau of the Budget. Scientists are expected to be united in their support.

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METEOROLOGY

World-Wide Weather Study Uses All Modern Methods

➤ A TEN-DAY world-wide weather study, which began April 1, is participated in by the United States together with 57 countries and will use all modern methods of securing meteorological information, the U. S. Weather Bureau revealed.

This program of meteorological research is under the sponsorship of the International Meteorological Organization, with headquarters at Lausanne, Switzerland. Plans were adopted for the observance of "International Aerological Days" by directors of the organization late last year. Dr. Sverre Petterssen, president of IMO's aerological commission, sent the program to the directors of meteorological services throughout the world in December.

In this they were requested to arrange for as many aerological observations as possible by the aid of radiosonde, self-recording instruments carried aloft by balloons; vertical ascents, balloon meterographs, weather reconnaissance flights and commercial aircraft and pilot balloons.

The U. S. Weather Bureau, the Air Force Weather Service and the Navy Aerological Service will participate in the program. They will probe the air 11 miles or more above the earth to get maximum coverage for the first time since the war.

The upper-air reports from all services will be combined at a central point and, taken together with similar coverage by surface observations for the same period, will provide the basis for a composite global weather picture.

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BACTERIOLOGY

Swimming Bacteria Not Helped by Tail Wagging

➤ BACTERIA that swim do so in the manner of Bo-Peep's sheep, "wagging their tails behind them." Their real work of swimming is done by a twisting motion of the whole microscopic body of the bacterium, and what appear to be flagellae or swimming organs are mere accidental streamers strung out of the mucilage-like covering of the body.

This new interpretation on bacterial swimming is offered by Dr. Adrianus Pijper of the University of Pretoria, S. A., in a letter to the editor of *Nature* (Feb. 7). He states that in very critical observation of swimming bacteria, made under special lighting conditions, he has repeatedly seen what looks like a tail being passively dragged along, and taking no real part in propulsive action.

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WILDLIFE

Game Animal Population Gains 25% in Three Years

➤ GAME animals in this country are on the up-grade, U. S. Fish and Wildlife Service counts indicate. A compilation of game censuses from all sources shows an increase from 6,598,422 head in 1943 to 8,240,400 at the end of 1946, latest date for which counts are reasonably complete.

Deer greatly outnumber all other big-game animals, accounting for 7,375,200 out of the total. Other animals in numbers above 100,000 are elk, pronghorn, peccary and black bear. Populations of bison, grizzly bear, moose, bighorn, and woodland caribou are smaller; though some of these range up to 24,000 head.

Science News Letter, April 3, 1948

IN SCIEN

NATURAL RESOURCES

U. S. Producing Own Class Of "Displaced Persons"

➤ AMERICA is producing its own class of "displaced persons" by wasteful misuse of land and other natural resources, declares Guy Irving Burch, editor of the *Population Bulletin* (March).

"It is quite possible that the amounts of topsoil, forests, minerals and wildlife that the American people have needlessly destroyed by hasty exploitation could support as many as 40,000,000 human beings," he points out.

"If this is true, it may mean that there will be 40,000,000 fewer people in the United States than might have been had the American people taken proper care of their natural resources.

"The possibilities are that the number of displaced Americans may become even larger, because the United States still is exploiting its natural resources at a rate which is displacing about 175,000 people a year."

Science News Letter, April 3, 1948

MEDICINE

"Blue Baby" Operation Originators To Get Award

➤ THE "blue baby" operation which has restored hundreds of children to health has won for its originators the $5000 Passano Foundation award presented each year by the Williams and Wilkins Co. medical publishers of Baltimore.

The award will be presented to Dr. Helen B. Taussig, associate professor of pediatrics, and Dr. Alfred Blalock, professor of surgery, Johns Hopkins Medical School, during the meeting of the American Medical Association on June 23 in Chicago.

This is the first time a dual selection has been made for the award, and the first time a woman has been named as a Passano award winner. Previous winners have been Dr. E. J. Cohn of Harvard, for his work on blood fractionation; Dr. Ernest Goodpasture of Vanderbilt for virus culture by the chick embryo method; and Dr. Selman Waksman of Rutgers for discovery of streptomycin, mold remedy for numerous diseases.

Science News Letter, April 3, 1948

NE FIELDS

AERONAUTICS

Navy Jet Fighters Train With Air Force Planes

➤ NAVY jet fighters will train with 50 Air Force Shooting Stars, the P-80 built by Lockheed, it was just revealed. These planes will be used in the jet-training program for Naval aviators prior to the delivery of Navy carrier-based jet fighters in quantity.

The training for the Navy aviators will be at land stations, and the pilots will become familiar with flight characteristics peculiar to jet planes, tactical and gunnery problems and navigational flights. The jet fighters that are designed for carrier operation have high speed like the Shooting Star and also high performance at low speed to enable them to take off from and land on the relatively short decks of carrier vessels.

Science News Letter, April 3, 1948

RADIO

New Type Communication May Have Military Uses

➤ A NEW TYPE of communication for certain military and civilian uses was described to the Institute of Radio Engineers meeting in New York by Harry Stockman, Watson Laboratories, Cambridge, Mass. It may possibly be employed in communication between airplanes, or from ship to ship on the ocean. There are other applications of military interest.

This system utilizes invisible waves of radio, infra-red rays, or of sound too high-pitched for the human ear. They are sent from an instrument and returned to the same instrument from a distant reflector. On the outward trip they carry no message. Returning, however, they bring signals with meaning.

The reflector provides a key part in the system. It is a signal-excited reflector, excited by the waves received, that changes, or modulates, the waves before returning them. This modulation may be done in one of many ways, Mr. Stockman stated. They were listed by him as position modulation, damping modulation, effective area modulation, doppler modulation, and interference, amplitude, directional, and polarization modulation.

The following coded or modulated reflectors may be mentioned, he said. They are turrets of corner reflectors, rotating with a speed controlling the modulation frequency; corner reflectors with variation in the path length of the internal beam components; and corner reflectors with variation of the reflection angle of the beam components.

Science News Letter, April 3, 1948

CHEMISTRY

Carnauba Wax Has Rival In Yucatan Waste Pulp

➤ THE Brazilian carnauba wax, widely used in America for polishes and waterproofing, now has a humble Mexican rival from the Yucatan peninsula, the Armour Research Foundation of the Illinois Institute of Technology in Chicago has revealed. It is extracted from the waste pulp from which henequen or sisal fiber for ropes has been taken.

The new wax has properties similar to those of carnauba. It is hard, has a melting point of approximately 185 degrees Fahrenheit, and bleaches readily to an almost colorless material for industrial finishes and coatings. Some 10,000,000 pounds annually can be made from available sisal waste pulp.

The product is one of the results of the industrial development research program being conducted in Mexico by the research foundation. Its program is conducted under the sponsorship of Banco de Mexico, and is designed to create new Mexican industries as well as to provide international credits through exports.

Science News Letter, April 3, 1948

GEOLOGY

Deep Submarine Canyons Found off New Guinea

➤ GREAT canyons have been found in the sea floor off the coast of New Guinea, R. C. Sprigg of the Australian Department of Mines announced in the British journal, *Nature*, Feb. 14. Cut in a bottom of soft volcanic mud, they range in depth between four and five thousand feet.

Theory for their cause most widely accepted at present is that during the Pleistocene ice age in northern lands, when much of the water was taken out of the sea and locked up in ice sheets on the land, rivers charging down steep slopes became submarine currents after they entered the ocean, and thus carved deep channels in the bottom. Similar submarine canyons have been found off the coasts of North America and Europe.

Science News Letter, April 3, 1948

ENGINEERING

Miniature Air Motor Delivers One Horsepower

➤ A TINY compressed air motor weighing 22 ounces built at State College, Pa., will deliver one horsepower when operated on air at 300 pounds pressure per square inch. It is an improved model of a Scotch device.

The original motor was developed by J. Haythorne, Technical Experimental Establishment, Greenock, Scotland. Modifications were made in the design, and the drawings sent to the Ordnance Research Laboratory here at Pennsylvania State College. The Scotland model weighed eight pounds and delivered one-half horsepower when operated at an air pressure of 350 pounds per square inch.

The improved motor, built from the drawings, runs at a speed of 4,000 revolutions a minute and, when properly mounted, does not have objectionable vibration.

Science News Letter, April 3, 1948

PSYCHOLOGY

Half of Criminals Found To Have Physical Ailments

➤ FIFTY per cent of criminals have indigestion, Dr. David Abrahamsen, psychiatrist at Columbia University, found from a four-year study of lawbreakers and their families.

The lawbreakers also suffer from heart trouble, nervous ills, skin trouble and respiratory diseases. Dr. Abrahamsen believes all these can be traced to friction in the home.

"Family tension breeds criminals," Dr. Abrahamsen concludes.

"Homes where there is bickering and nagging cause children to tighten up with resentment and hostility, resulting in their rebellion against authority and responding to the will of the gang."

Sometimes the criminal was treated cruelly in his home or failed to receive a normal amount of affection. In some cases he had dominating parents, in other cases weak ones. Sometimes a brother or sister was the favorite of the family and received more than a fair share.

Result: Jealousy, resentment, tendency to spiteful revenge and later not only criminal action but also illness of the kind in which psychological and physical elements are linked, as in stomach disorders, skin ailments and some kinds of heart trouble.

Science News Letter, April 3, 1948

ASTRONOMY

200-Inch to Test Theories

Hope to determine such problems as whether the universe is expanding, abundance of chemical elements in stars and if there are canals on Mars.

By MARTHA MORROW

See Front Cover

➤ THE 200-inch telescope on Palomar Mountain, in San Diego County, Calif., so enormous it completely overawes one, will only be given tasks fit for such a benevolent giant.

By taking a snapshot of Mars for the first time, it should allow astronomers to decide whether intelligent beings have lived on the planet.

Most of the time of the "big eye" will be reserved for hunting stellar "game" too distant or too faint to be caught by smaller instruments. It will be able to see millions of groups of stars so distant that the light it records started on its way to us a billion years ago.

The telescope will finally swing into action next June or July, predict officials of the California Institute of Technology and the Mount Wilson Observatory, responsible for its operation.

Its first problems will be designed to confirm, if possible, many theories which already exist. It may be within the power of this keenest-eyed of all telescopes to determine:

Whether the universe is expanding.

The relative abundance of chemical elements in the stars.

Whether there are canals on the planet Mars.

Structure of the Universe

The 200-inch telescope, because of its ability to penetrate into space twice as far as has ever been possible before, may help astronomers decide the structure and behavior of the universe as a whole. Up to the present, astronomers have had to infer the nature of the universe from the sample around us—the only portion they could see.

The Palomar telescope will permit us to explore a volume of space about eight times as great as that now available. It will give astronomers a larger sample with which to work.

Light from distant groups of millions of stars, when broken up by a prism, has been found shifted to the red end of the spectra. Many astrophysicists believe this indicates that these far-away nebulae are racing away from the earth and that the entire universe is expanding. By gathering in light from twice as great a distance as was ever possible before, the giant eye should make it possible to confirm this theory or indicate that this phenomenon must be attributed to some new principle of nature.

Enough light will be gathered by the 200-inch telescope to make it possible to spread the spectra of stars over a much wider area than ever before. By fanning out the light even farther, more detailed study of the spectra of stars and nebulae can be undertaken. By comparing data already obtained with what the new telescope tells us, astronomers may determine the relative abundance of chemical elements of stars and nebulae.

Such new data will bear directly on two fundamental problems: the source of stellar energy and the origin of chemical elements.

Great Light-Gathering Power

The telescope was not designed to study near-by planets, but to reach out farther into the universe than ever before, Dr. Ira S. Bowen, director of the Mount Wilson Observatory, who will also direct the observatory atop Palomar Mountain when it is completed, reports. But because of its great light-gathering power, the 200-inch makes it possible for the first time to take a snapshot of the planet.

All photographs of Mars in the past have had to be time exposures, many minutes being needed for the planet's faint light to show up sufficiently on the plate. But the shimmer or twinkling of the planet also showed up on the film and made it impossible to obtain a clear picture.

The 200-inch telescope will gather enough light to produce a picture that should be sharp enough to disclose the canals, if they exist. These so-called canals, if found, would probably be accepted as indication that intelligent life exists on Mars today or was there in the past.

These are a few examples of what may be accomplished with the 200-inch telescope, that will surpass all others in resolving power, dispersion and space penetration. But many years will probably pass before these and other questions, that have been puzzling man for hundreds and even thousands of years, can be answered.

For the first time the new 200-inch Palomar telescope will enable astronomers to see visually some of the far distant nebulae with which they have been working for years.

Dr. Edwin P. Hubble, of Mount Wilson and Palomar Observatories, a leading investigator of the distant galaxies, looks forward eagerly to the night this will happen.

"Some of the nebulae we have been working on for many years with Mount Wilson's 100-inch telescope were not visible through the telescope but did show up on photographic plates, Dr. Hubble explained. "These we shall now be able to see through the 200-inch."

But ever striving to push back the veil of distance, Dr. Hubble and his associates will again be working with a set of nebulae, this time a new set, that cannot be seen visually. Only after photographic plates have soaked up their light for many minutes, or even hours, will they show up as pinpoints of brightness.

Distant nebulae such as these are very important in studying the evolution of star systems.

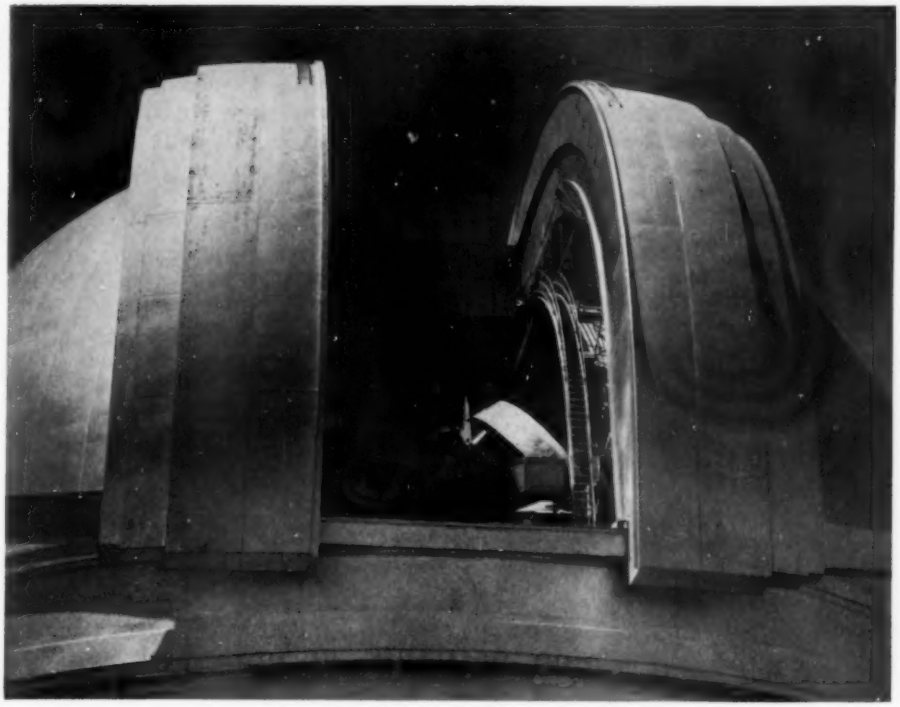
The 200-inch telescope is the world's most complete push-button observatory. The tremendous telescope atop Palomar Mountain is so perfectly balanced that a push of a button sets it in motion.

Telescope Moved Electrically

The telescope tube, complete with its cage, is 55 feet long and weighs 140 tons. Unlike small telescopes, that can be swung into position by a push of the hand or by simple mechanical means, the telescope is moved electrically.

So that little time will be lost when seeing is good, the telescope can be set so it automatically seeks a star's position. This automatic setting is accurate to one second of arc.

The telescope not only locates the star, but follows it across the sky. The speed with which the telescope slowly moves is adjusted to agree with the rate at which the star climbs up from the horizon. Either the astronomer who "rides"



PALOMAR TELESCOPE—This shows the 200-inch dome with its shutters open, revealing a portion of the telescope and the prime focus platform.

the telescope or his assistant at the controls below can set the telescope into motion.

A lot of light is thrown away by the 200-inch mirror of Palomar's giant telescope without cutting down its efficiency.

In the center of the mirror there is a hole 40 inches across. This is the exact size of the lens in the world's largest refracting telescope at Yerkes Observatory. This opening in the mirror was needed so light from the Cassegrain mirror could be brought to a focus below the mirror. It is not large enough to in any way affect the utility of the mirror. A certain amount of light must be cut off in all reflecting telescopes.

This is the first telescope so large that the amount of light it is feasible to throw away can hold a man. It is the only telescope in the world in which an observer actually rides. Photographs are taken and the astronomer actually sits in a 72-inch cage at the telescope's prime focus, high above the mirror, as shown on the cover of this week's SCIENCE NEWS LETTER. It is approached by a moveable carriage.

At present the supports on the 15-ton mirror are being adjusted and readjusted so that its parabolic surface will be accurate to within two millionths of an inch, irrespective of the direction in which the massive piece of glass is tilted. This high degree of accuracy was made possible by Dr. John A. Anderson, who supervised the mirror's grinding and polishing.

The mirror, including the cellular back, is approximately 24 inches thick at the edges and 20½ inches at the center. But its solid face is only about 4½ inches thick.

Begin Work Early in Summer

The telescope is expected to begin work early this summer. At first it will be used solely for photographic work. Only the one gigantic mirror, in perfect adjustment, is needed for this. The plate is placed at the telescope's prime focus and six to a dozen photographs can be made a night, depending on the exposure required.

Although the 200-inch is the primary and most important mirror, the telescope will have six others. Three of these are convex and three flat. They will be used for the Cassegrain and Coude focuses.

The auxiliary mirrors, themselves several feet across, will be mounted in the telescope so that they can be used in any combination necessary. When not needed, they can be moved into positions where they do not obstruct other focuses.

Several enormous prisms will also be needed to complete the telescope. These are needed to study the spectra of distant nebulae or faint stars.

It will probably be another two or three years before the telescope is really completed with all its auxiliary equipment, estimates Dr. Bowen. Although direct photography will be possible early this summer, spectroscopic studies must be postponed until the other mirrors and prisms are in position.

Another push-button telescope, located near-by on Palomar peak, is also expected to begin work this summer. This is the 48-inch Schmidt-type telescope, the largest of its type.

The Schmidt will map the skies and search for objects worthy of the "big eye's" time. This telescope is itself capable of reaching millions of light years out into space (a light year is the vast distance over which light, traveling 186,000 miles a second, passes in a year).

The Schmidt at a glance sees much more than the 200-inch. On one plate it shows a field 36 square degrees in area. The 200-inch telescopic giant pinpoints its vision on a field only a quarter of a square degree in area.

These two major telescopes and the

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Light travels at about 11,000,000 miles a minute, so a *light-year*, a unit of distance used by astronomers, is about 6,000,000,000,000 miles.

Efforts to prolong the life of automotive and aviation engine pistons by coating the tops with pure *beryllium*, made in Germany during the war, gave promising results.

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other smaller ones on Palomar Mountain are the property of the California Institute of Technology. The observatory, however, will be run jointly by Cal. Tech and the Carnegie Institution of Washington. The work at Mount Wilson and Palomar will be so integrated that the excellent telescopes on these near-by mountains, each best suited to a specific task, will be used to maximum advantage.

The 200-inch telescope represents man's most daring effort to reach out into space. It results primarily from the vision, foresight and efforts of the late Dr. George Ellery Hale, "father" of Mount Wilson Observatory. He obtained from the Rockefeller Foundation the money with which to build the Palomar telescope and observatory. In all, more than six and a half million dollars was given to Cal. Tech. for this vast scientific instrument.

The telescope's construction has been under the direction of an observatory council headed by Dr. Hale and, after his death, by Dr. Max Mason.

Dr. Hale did not live to see his dream come true, but he did see it well on its way to completion. It is up to others—to those who use its fruits to unlock the secrets of the universe—to justify this tremendous undertaking.

Science News Letter, April 3, 1948

ASTRONOMY

Minor Planet Near Earth

Tiny asteroid is fourth or fifth known to have entered the earth's orbit. It will come within 15,500,000 miles of the earth and 84,000,000 miles of the sun.

➤ A NEW tiny planet, one of only four or five known to have entered the earth's orbit, has been spotted by C. A. Wirtanen of Lick Observatory of the University of California. It will come within 15,500,000 miles of the earth and 84,000,000 miles of the sun.

Minor planets usually whirl around the sun in orbits lying between the paths followed by Mars and Jupiter. But instead of staying between the orbits of these two large planets and thus keeping 140,000,000 to 485,000,00 miles from the sun, this asteroid gets even closer to the sun than does the earth.

When first spotted on photographic plates, the asteroid was of about the 13th magnitude, and thus visible only through a powerful telescope, states Dr. C. D. Shane, Lick Observatory director. Since then it has brightened slightly as it approached the earth, and is now 12th magnitude.

The tiny planet, about two miles in diameter, was discovered on March 7. It was found to be rapidly approaching the earth. On March 22 it was about 111,500,000 miles from the sun (the earth is 93,000,000 miles from the sun) and within 21,000,000 miles of the earth, calculates Dr. Leland E. Cunningham of the university's Students' Observatory. By March 30 it was less than 18,000,000 miles away. But there is no danger of this flying mountain crashing into our planet—it can never come nearer than 15,500,000 miles of the earth, study of its path shows.

Only three or four asteroids of the known 1,600 previously have entered the earth's orbit. One of these came almost as near to the sun as the planet Mercury, the innermost of the planets. Each of these faint asteroids was visible for such a short time, however, that it was impossible to accurately calculate their paths and the length of time needed for them to race around the sun. They have since been lost in space.

Wirtanen's new asteroid, on the other hand, will probably not be lost. It has already been observed on several nights.

Going rapidly south of the earth, about the middle of April the planet will be directly under the earth, where it can be seen all night by observers in the southern hemisphere. At that time it will be just about as close to the earth as it can come.

The minor planet will make its closest approach to the sun on May 21. It will then be 9,000,000 miles closer to the sun than is the earth. But despite its nearness to the sun, it will probably be two or three magnitudes fainter than it is now.

This is because we will not be seeing the fully illuminated disk of the planet, but only a part of it. Just as the moon at quarter is not as bright as when we see its entire disk lighted by the sun, so this asteroid will appear fainter even though nearer the sun than at present.

Science News Letter, April 3, 1948

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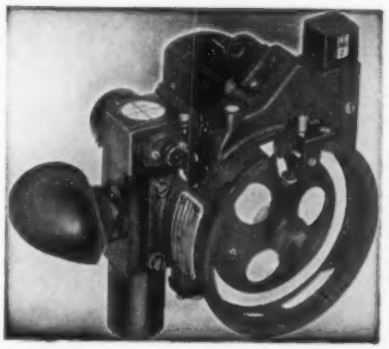

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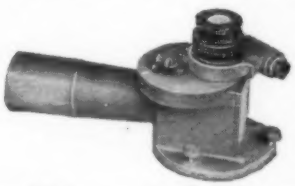

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BIOLOGY

NATURE RAMBLINGS

by Frank Thone

Rejected Rainbow

➤ EXCEPT for man and some of his nearest relatives among the primates, most mammals seem to be color-blind. Birds, on the contrary, are clearly able to distinguish between colors. Principal exceptions are noctural birds such as owls, and crepuscular or twilight birds like whippoorwills; these distinguish colors either badly or not at all.

Not only are most birds able to tell colors apart, but they will hesitate to take food if it is of the "wrong" color. This was first noticed years ago when an effort was made to control the numbers of English sparrows by scattering poisoned grain. The birds would not pick up grain that had been soaked in Paris green or London purple, seemingly because it just didn't look right.

Now this reluctance to eat "off-color" grain is being used in reverse, to save useful song and game birds from being killed by poisoned grain baits intended for prairie dogs, ground squirrels and other rodent pests. The method was worked out by a biologist of the U. S. Fish and Wildlife Service, E. R. Kalmbach, at the field laboratory in Denver.

After the grain has been impregnated with poison it is dyed bright green, saffron yellow, staring purple or flaming red. A spoonful is dropped at the mouth of each rodent burrow, and in 24 hours it is usually all cleaned up. But birds very rarely touch it.

Mr. Kalmbach has run scores of tests, offering grain (unpoisoned, of course) in its natural color and in rainbow hues to a wide variety of birds, from barnyard fowl to sparrows and doves. The birds regularly pick up the natural-colored grain and let the dyed grain lie, even when the choice means rejecting perfectly wholesome though strange-colored food. Rats and other grain-eating rodents, on the contrary, pay no attention to color but pick up all the grain indiscriminately.

There is one partial exception to the birds' rule of rejecting colored grain. Ducks and other water-fowl will sometimes eat at least a little of it, though even they show a preference for natural-colored food. Mr. Kalmbach thinks it possible that this may be connected with the fact that water-fowl do a good deal of their feeding under water, where the food is either obscured by turbidity or even actually buried in the mud, and hence found by touch rather than by sight.

Science News Letter, April 3, 1948

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CENTRIFUGAL AND AXIAL FLOW PUMPS: Theory, Design and Application—A. J. Stepanoff—*Wiley,* 428 p., illus., $7.50.

FUNDAMENTALS OF PHOTOGRAPHIC THEORY—T. H. James and George C. Higgins—*Wiley,* 286 p., illus., $3.50. A technical book presupposing basic knowledge of physics and chemistry.

KLYSTRONS AND MICROWAVE TRIODES—Donald R. Hamilton, Julian K. Knipp and J. B. Horner Kuper—*McGraw-Hill,* 533 p., illus., $7.50. Covering the principles underlying the operation of the tubes known as klystron and planar-grid, basic to radar.

LORAN: Long Range Navigation—J. A. Pierce, A. A. McKenzie and R. H. Woodward, Eds.—*McGraw-Hill,* 476 p., illus., $6.00. A technical book on the Loran all-weather navigation system for ships and airplanes.

MICROWAVE DUPLEXERS—Louis D. Smullin and Carol G. Montgomery—*McGraw-Hill,* 437 p., illus., $6.50. Dealing with the use of a single antenna for both receiving and transmitting as in radar.

MICROWAVE RECEIVERS—S. N. Van Voorhis—*McGraw-Hill,* 618 p., illus., $8.00. Discussing the receivers used in radar systems but including material applicable elsewhere.

PLANTS OF THE HOLY SCRIPTURES—Eleanor King—*New York Botanical Garden,* rev. ed., 23 p., illus., paper, 25 cents. Background information on bible plants in the light of modern scientific knowledge.

PRESERVATION OF GRAINS IN STORAGE—Stephen S. Easter, Ed.—*Food and Agriculture Organization, (Columbia University Press),* 174 p., illus., paper, $1.50. Papers presented at the International Meeting on Infestation of Foodstuffs, Aug. 5-12, 1947.

PRINCIPLES OF FOOD FREEZING—Willis A. Gortner, Frederick S. Erdman and Nancy K. Masterman—*Wiley,* 281 p., illus., $3.75. Covering all aspects of this new type of food preservation from the preparation of the food to the transportation and cooking.

PRINCIPLES OF JET PROPULSION AND GAS TURBINES—M. J. Zucrow—*Wiley,* 563 p., illus., $6.50. The facts necessary for understanding this new field of engineering with a review of general principles.

RADIANT HEATING—Richard Woolsey Shoemaker — *McGraw-Hill,* 306 p., illus., $4.00. Practical information intended not only for architects and engineers but also for home builders.

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RUSSIAN ARCHITECTURE: Trends in Nationalism and Modernism—Arthur Voyce —*Philosophical Library,* 282 p., $5.75. Tracing in text and a large number of photographs the history of architecture in Russia.

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Pohl—*American Midland Naturalist,* 91 p., paper, 90 cents.

THE TECHNOLOGICAL BASIS FOR NATIONAL DEVELOPMENT AND ITS IMPLICATIONS FOR INTERNATIONAL CO-OPERATION: A Statement of Guiding Principles for Study of Resources for Optimum Living Standards—Mary L. Fledderus and Mary van Kleeck—*International Industrial Relations Institute,* 44 p., paper, 50 cents.

A TREASURY OF SCIENCE FICTION—Groff Conklin, Ed.—*Crown,* 517 p., $3.00. A collection of 30 stories for those fans who like to escape from this scientific world by voyaging into the strange realm of fantastic fiction.

UGARITIC MYTHOLOGY—A Study of Its Leading Motifs—Julian Obermann—*Yale University Press,* 110 p., $2.75. From recently deciphered literature of a people who flourished in northern Syria some fifteen centuries before the beginning of our era.

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YOUR FARMHOUSE: PLANNING THE BATHROOM—Mildred Stenswick and others—*Govt. Printing Office,* 16 p., illus., paper, 10 cents. An aid to those planning a new house or just remodeling.

Science News Letter, April 3, 1948

POPULATION

Americans Will Be Older, More Conservative in 1975

➤ AMERICANS of 1975 will be more conservative and less willing to make political and economic changes, a scientist predicted.

Dr. Warren S. Thompson, director of the Scripps Foundation for Population Studies at Miami University, Oxford, Ohio, explained that there will be more older people in the population of the United States than there are now.

Dr. Thompson discussed the future population of the nation as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network. The authority on population trends was guest at the first broadcast of the program which on March 27 marked its eighteenth anniversary on the air.

Comparing forecasts of future population made in 1930 with those of today, Dr. Thompson declared that neither World War II nor the depression had greatly changed our outlook.

By 1975, he predicted, there will be twice as many Americans aged 65 or over as there are today. There will be more middle-aged persons, but fewer youngsters. And this change in population may have important effects on life in the U. S. 27 years from now.

"We'll probably become more conservative as we become an older people—we'll be more reluctant to make adjustments in our political and economic institutions," Dr. Thompson forecast.

"More of the important positions in politics and in our economy will be in the hands of older men.

"And more business will actually be owned by older people.

"And these older people will resist changes that will weaken their power and appear likely to make their economic position less secure."

One possible danger from this change in population ages is the threat of economic stagnation, the scientist warned.

Science News Letter, April 3, 1948

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Science Service Radio

➤ LISTEN in to a discussion on jet engines on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 10. Mr. Reinout Kroon, engineering manager of the Westinghouse Aviation Gas Turbine Division and Mr. Winston New, manager, will be guests of Mr. Watson Davis, director of Science Service. The principles of jet propulsion will be discussed.

Science News Letter, April 3, 1948

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 408. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

⚙ *SMALL COLD-FRAME, for home gardeners who want to have early plants, is a box with sliding covers of a plastic-coated wire mesh. The cover is lightweight, shatter-proof and hail-proof; it admits ultraviolet and infra-red rays from the sun and holds the heat in.*
Science News Letter, April 3, 1948

⚙ *SPECIAL CONVERTERS make television available to the many people who live in city areas and elsewhere served by electricity of the direct current type. No special wiring is required for them; they operate with a new-type automatic remote starting system.*
Science News Letter, April 3, 1948

⚙ *SHOWER CONTROL for the bathroom consists of two special valves, one in the hot-water line and the other in the cold-water pipe, which are connected with two small copper tubes. It protects the bather from temperature changes when someone turns on a kitchen faucet.*
Science News Letter, April 3, 1948

⚙ *RAILROAD CAR washer cleans the outsides of coaches, one car per minute, as the train passes. Upright rotary scrub brushes whirl as the car goes by. Jets of cleaning solution spray the coaches, then additional brushes shower cold water and give the train a final shine.*
Science News Letter, April 3, 1948

⚙ *MUSICAL HORN, shown in the picture, has a full chromatic scale and is tunable by the mouthpiece. Fingering is like that of a simplified flute. The horn itself is made of a plastic that can stand abuse, careless handling and repeated cleanings.*
Science News Letter, April 3, 1948

⚙ *COLOR-PRINTING machine, that will print on any material from tissue paper to six-inch-thick metal, is reported in England. It is little larger than a typewriter, and is designed for the rapid reproduction of drawings, signs, notices, and even paintings, on wood, rubber, glass, textiles, plastic or metal surfaces.*
Science News Letter, April 3, 1948

⚙ *BUTT GAGE, to simplify and speed the hanging of doors, is a steel die with a curved handle. The three sides of the gage have chisel cutting edges, accurately ground and honed. In use, it is placed on the edge of the new door, and hammered in.*
Science News Letter, April 3, 1948

⚙ *GLARE FILTER is for use in automobiles to eliminate the hazard caused by glaring headlights behind the car reflected from the rear-view mirror. It is a plastic shield, neutral in color, that can be swung in front of the mirror when needed.*
Science News Letter, April 3, 1948

Question Box

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ASTRONOMY

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